nents that, if too near the periphery, can also lead to weaknesses and voids. In such applications, the preferred process includes step **550** wherein the periphery of each transceiver on a sheet is subject to a second application of heat and pressure for activating laminate adhesive applied in step **420**. The additional heat and pressure in such a localized periphery can deform the films to form minute bosses. Thus, the step is called embossing. The aspect of the effective application of heat and pressure is more important than the extent of consequential deformation.

In an alternate embodiment, each enclosure is evacuated. Lamination for such an embodiment is conducted in an evacuated environment. Embossing in yet another embodiment is also conducted in an evacuated environment

After step **540**, the circuitry of the battery powered transceiver is active by virtue of the completed circuits formed when the top cover layer is aligned and butt contacts are formed with components and the base layer. Functional tests of multiple or individual transceivers are now feasible.

In step **560**, transceivers are functionally tested. To prevent interference between tests of individual transceivers, a pair of grounded plates with surface features are placed on both sides of a sheet of enclosed transceivers so that each transceiver operates inside a shielded cavity. The wavelength used for testing is selected such that leakage through the thickness of the embossed seal is negligible. Plates similar to the embossing die used in step **550** are used in one embodiment. Each cavity includes an antenna for transmitting stimulus signals and for receiving response signals for measuring the quality of each transceiver. Measurements include, for example, receiver sensitivity, transmitted spectrum, message handling capability, self-testing, and response timing.

In step **570**, the sheet of tested transceivers is sheered in two dimensions to singulate or separate the transceivers from one another. In an alternate and equivalent embodiment, a backing material is applied to one side of the sheet prior to singulation. Singulation for this embodiment is accomplished by kiss cutting through the top and base films leaving the transceivers attached to the backing material. Transceivers, whether attached to the backing or loose are then sorted based on the results of functional testing performed in step **560** and additional testing as needed.

FIG. **13B** is a process flow diagram showing the steps of the present invention used to manufacture another enclosed transceiver of the types shown in FIGS. **2–9**. This embodiment of the method of the present invention includes nine (9) processing steps or fabrication stages which are used in the overall manufacturing process and in the construction of an enclosed transceiver.

In one embodiment the nine steps are performed sequentially as follows. In step **610**, a circuit pattern is initially formed on a base layer material. This base layer material is preferably a polymer such as a polyester film that is laminated with a barrier layer material such as polyethylene and/or polyvinylidenechloride (PVDC). In step **612**, the circuit pattern is cured and a conductive epoxy material is applied. In step **614** an integrated circuit chip is aligned onto the base layer. In step **616**, two (2) batteries are aligned onto the base layer. In an alternate enclosed transceiver, the batteries are stacked vertically in either a series or parallel electrical connection. In step **618**, the epoxy applied in step **612** is cured. In step **620**, a stiffener material is applied. In step **622** epoxy is applied to the top surface of the battery and then the top half of the base layer is folded over the bottom half so that the top half forms the top cover. In step **624**, the epoxy material applied in step **622** is cured. Finally, in step **626**, the package is sealed to complete manufacturing of the package.

Various modifications may be made in and to the above described embodiments without departing from the spirit and scope of this invention. For example, various modifications and changes may be made in the antenna configurations, battery arrangements (such as battery stacking), device materials, device fabrication steps, and the functional block diagrams without departing from the scope of this invention. The various off-chip components such as the antenna, battery, and capacitor- are manufactured on-chip in alternate and equivalent embodiments. As a second example, the antenna in another alternate and equivalent embodiment is formed on the outer surface or within the outer film. In such an arrangement, coupling to the antenna is through the capacitance of the outer film as a dielectric. When formed on the exterior, the material comprising the antenna also provides hermeticity to the film for protecting the enclosed transceiver. Accordingly, these and equivalent structural modifications are within the scope of the following appended claims.

As previously suggested, an enclosed transceiver used as an RFID device has utility directed to a wide variety of applications including, but not limited to, airline baggage (luggage, freight, and mail); parcel post (Federal Express and United Parcel Service); U.S. Mail; manufacturing; inventory; personnel security.

While the particular invention has been described with reference to illustrative embodiments, this description is not meant to be construed in a limiting sense. It is understood that although the present invention has been described in a preferred embodiment, various modifications of the illustrative embodiments, as well as additional embodiments of the invention, will be apparent to persons skilled in the art, upon reference to this description without departing from the spirit of the invention, as recited in the claims appended hereto. It is therefore contemplated that the appended claims will cover any such modifications or embodiments as fall within the true scope of the invention.

The words and phrases used in the claims are intended to be broadly construed. A "sticker" refers generally to a label, tag, marker, stamp, identifier, packing slip, invoice, package seal, tape, band, clasp, medallion, emblem, shield, and escutcheon regardless of printed or handwritten material thereon. Mechanical coupling of a "sticker" so defined to an article, person, plant, or animal is not restricted to adhesive but is intended to broadly include all forms of fastening, tieing, and securing.

What is claimed is:

1. A data storing device comprising:

a housing including first and second opposed portions;

an integrated circuit coupled to the first portion of the housing, the integrated circuit including a random access memory;

a battery supported by the first portion of the housing and having first and second terminals, the first terminal being coupled to the integrated circuit; and

connection circuitry coupling the second terminal of the battery to the integrated circuit to complete a circuit, the connection circuitry including a conductor supported by the second portion of the housing and movable with the second portion of the housing.

2. A data storing device in accordance with claim **1** wherein the battery is a thin film battery.

3. A data storing device according to claim **1**, wherein the conductor completes a circuit and supplies electrical power

to the memory when the first and second portions of the housing are sealed together and does not complete the circuit or supply electrical power to the memory when the first and second portions are not sealed together.

4. A data storing device according to claim 1, wherein the conductor completes a circuit and supplies electrical power to the memory when the first and second portions of the housing are coupled together and does not complete the circuit or supply electrical power to the memory when the first and second portions are not coupled together.

5. A data storing device according to claim 1, wherein the first and second portions of the housing hermetically seal the integrated circuit and the battery.

6. A data storing device according to claim 1, wherein the first and second portions of the housing hermetically seal the integrated circuit and the battery when the first and second portions of the housing are mated together, and wherein the conductor completes a circuit and supplies electrical power to the memory when the first and second portions of the housing are mated together and does not complete the circuit or supply electrical power to the memory when the first and second portions are not mated together.

7. A data storing device comprising:

a housing defined by first and second housing portions, the second housing portion being movable relative to the first housing portion between mated and open positions;

an integrated circuit supported by the first housing portion;

a battery in the housing; and

a conductor supported by and movable with the second housing portion, the conductor coupling the battery to the integrated circuit when the second housing portion is in the mated position.

8. A data storing device in accordance with claim 7 wherein the integrated circuit comprises a static random access memory.

9. A data storing device in accordance with claim 7 wherein the integrated circuit includes a memory and a microprocessor, and wherein the conductor couples the battery to the integrated circuit.

10. A data storing device in accordance with claim 7 wherein the integrated circuit includes a memory and a microprocessor, wherein the memory is a static random access memory, and wherein the conductor couples the battery to the integrated circuit so that the integrated circuit is powered by the battery, thereby resulting in the static random access memory being powered by the battery.

11. A data storing device in accordance with claim 7 wherein the battery comprises a thin film battery.

12. A data storing device in accordance with claim 7 wherein the housing has a thickness of about 0.03 inches.

13. A data storing device in accordance with claim 7 wherein the integrated circuit includes a memory, an RF transmitter, and a microprocessor, wherein the memory is a static random access memory, and wherein the conductor couples the battery to the integrated circuit so that the integrated circuit is powered by the battery, thereby resulting in the static random access memory being powered by the battery.

14. A data storing device in accordance with claim 7 wherein the integrated circuit includes a memory, a microwave transmitter, a microwave receiver, and a microprocessor, wherein the memory is a static random access memory, and wherein the conductor couples the battery to the integrated circuit so that the integrated circuit is powered by the battery, thereby resulting in the static random access memory being powered by the battery.

15. A data storing device in accordance with claim 7 and further comprising conductive epoxy coupling the battery to the integrated circuit.

16. A data storing device according to claim 7, wherein the first and second housing portions enclose and hermetically seal the integrated circuit and the battery when the first and second housing portions are in the mated position.

17. A data storing device according to claim 7, wherein the conductor does not supply electrical power to the integrated circuit when the first and second housing portions are not in the mated position.

18. A data storing device according to claim 7, wherein the conductor completes a circuit and supplies electrical power to the integrated circuit when the first and second portions of the housing are sealed together and does not complete the circuit or supply electrical power to the integrated circuit when the first and second portions are not sealed together.

19. A portable data storing device comprising:

a housing defined by first and second housing portions each including planar surfaces;

an integrated circuit including a static random access memory configured to store the data, the integrated circuit being supported from the first housing portion;

a thin film battery in the housing; and

a conductor supported by and movable with the second housing portion, the conductor coupling the battery to the integrated circuit so that the integrated circuit is powered by the battery when the first and second portions are mated and thereby resulting in the static random access memory being powered by the battery and so that the integrated circuit is not powered by the battery when the first and second portions are not mated.

20. The portable data storing device of claim 19, wherein the integrated circuit further comprises a microprocessor, a spread spectrum RF transmitter controlled by the microprocessor, an RF receiver controlled by the microprocessor.

21. A portable data storing device in accordance with claim 19 wherein the housing has a thickness of about 0.03 inches.

22. A portable data storing device in accordance with claim 19 and further comprising conductive epoxy electrically coupling the battery to the integrated circuit.

23. A portable data storage device comprising:

a first housing member;

an antenna formed on the first housing member;

a second housing member configured to be mated to the first housing member;

a first battery disposed between the first and second housing members, a first electrode of the first battery contacting a first power conductor on the first housing member;

a second battery disposed between the first and second housing members, a first electrode of the second battery contacting a second power conductor on the first housing member;

an integrated circuit disposed on a side of the first housing member configured to be mated to the second housing member; and

a conductor formed on the second housing member, the conductor coupling the first and second batteries in series and supplying electrical power to the integrated circuit when the second housing member is mated to the first housing member and not coupling the first and second batteries in series or supplying electrical power to the integrated circuit when the second housing member is not mated to the first housing member.

24. The portable data storage device of claim **23**, wherein the integrated circuit further comprises a microprocessor, a RF transmitter controlled by the microprocessor, an RF receiver controlled by the microprocessor and a static random access memory coupled to the microprocessor and configured to store the data, the RF transmitter and RF receiver being operatively coupled to the antenna.

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